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VOLUME XXVII OCTOBER, 1928 NUMBER 7

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Dr. Atwood is President of Clark University and author of many publications in the field of geography. He is past-president of the National Council of Geography Teachers and was its official representative to the International Geographical Union, at London, July, 1928.

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Mr. Halverson was formerly a member of the faculty of Joliet High School and Iowa State Teachers College. He is now at the University of Wisconsin. Paralleling the article here presented is one entitled "Some Problems in the Teaching of Physiography in the High School," which appeared in School Science and Mathematics, June, 1925.

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THE IRON AND STEEL INDUSTRY OF EUROPE

W. O. BLANCHARD
University of Illinois

Tho deposits of iron ore are found widely distributed over the earth, almost one-half of the *known* iron reserves as well as the great bulk of the iron and steel industry are concentrated into two comparatively limited areas. Eastern United States and western Europe together account for nine-tenths of the world's output of iron ore, pig iron and steel as well as of coal. Furthermore, these two regions are of approximately equal importance in the share contributed.[1]

The concentration of the iron and steel industry is a natural consequence of the operation of a large number of factors of which the location of iron ore is but one—and usually not the major one. The complete transformation of ore to finished steel goods requires huge quantities of coal; the great bulk and low price of the ingredients as well as of the end products serve to greatly emphasize the importance of cheap transportation; and the economy of mass production in single large units where all the various stages of manufacture from smelting to the making of the most highly finished products calls for large investments of capital, large organizations and large population to supply the army of workmen. The bringing together of these is, in turn, justified only when the supply of ore and fuel is large. The occurrence of any considerable number of these favorable conditions in any one place is necessarily rare hence the great importance of the two regions named. In fact their advantages are so great as to assure them undisputed leadership for many years to come.

[1] Before the war, western Europe led by a small margin, but the positions have since been reversed and with respect to iron and steel the United States is now in the lead.

THE EUROPEAN IRON AND STEEL ZONE

The great European industrial region forms a narrow east-west zone stretching from Wales to Silesia (See Fig. 1). Possessing only one-sixteenth of the area of the continent this belt is nevertheless the home of one-fourth of the population of Europe. The chief industries found here depend directly or indirectly upon iron and steel and this zone accounts for four-fifths of the coal and three-fourths of the pig iron output of all Europe.

FIG. 1. The great industrial zone of Europe. Tho containing only 1/16 the area it possesses 1/4 the population and accounts for 4/5 of the coal and 3/4 of the pig iron production of all Europe.

Within this extended industrial belt are three major centers of activity—Britain at the west, Silesia at the east and the Ruhr-Lorraine in the center. Each of the three possesses a large coal field or fields which serve to motivate industry, but the central and the western have in addition, two other valuable assets in their local iron ores and in their location close to the seaboard. Silesia, on the other hand, is handicapped in its lack of iron ore and in its situation far inland. Dotted with mills and factories this belt is

the "smoky way" where over considerable areas the farm is subordinate to the workshop so that for the industrial zone as a whole the per capita production of bread grains is only about one-half that in the rest of Europe.

IRON AND STEEL IN BRITAIN

Great Britain has been a pioneer in the iron and steel industry, smelting works having been known to exist in pre-Roman times. Dependent upon charcoal for fuel until the middle of the eighteenth century, iron smelting was located in the heavily wooded areas for ore was widely distributed. The tremendous demand for charcoal threatened to destroy England's forests until parliament restricted cutting. With the substitution of coke the smelters forsook the forests for the coal fields. Each of the great coal deposits of the United Kingdom has had iron ore bodies in fairly close proximity and has become the seat of extensive iron and steel works. Eventually some of the ores became exhausted. Furthermore, with the invention of the Bessemer process of cheap steel manufacture, in 1856, a process for which some British ores were unsuited, there began the importation of non-phosphorus ores from abroad. Thus, these steel centers on or close to tide water had a marked advantage over the inland plants. Not only could special ores be imported easily but with the expansion of the industry foreign markets could be easily reached from the same docks. The latest readjustment has been, then, one in which access to the sea has played an important rôle. It is significant that four out of the six major iron and steel districts are on the coast and that these four account for about three-fourths of the steel facilities of the country. However, even the inland centers of Birmingham and Sheffield are but a short distance inland and have excellent transportation at exceptionally low rates for export cargo. Tho coal, ore and flux are widely distributed, special advantages have served to segregate the major part of the industry into some half dozen regions (See Fig. 2).

The West Scottish iron and steel district centers about Glasgow and the Clyde. Initially dependent upon imported ores the industry was greatly stimulated in 1760 when local iron deposits were discovered. A century of mining exhausted these supplies and again the district has had to depend upon other sources for iron—chiefly the Cleveland district and foreign fields. Its abundant

coal, a tidewater position, an early start, its large population of highly skilled workmen, and especially its important local market in the ship building and other industries which have grown up around it, have enabled it to maintain a fair output. At one time it was the leading district of Britain and as late as 1901 it ranked second only to the Cleveland area. Its steel capacity is now about one-fifth that of all British plants.

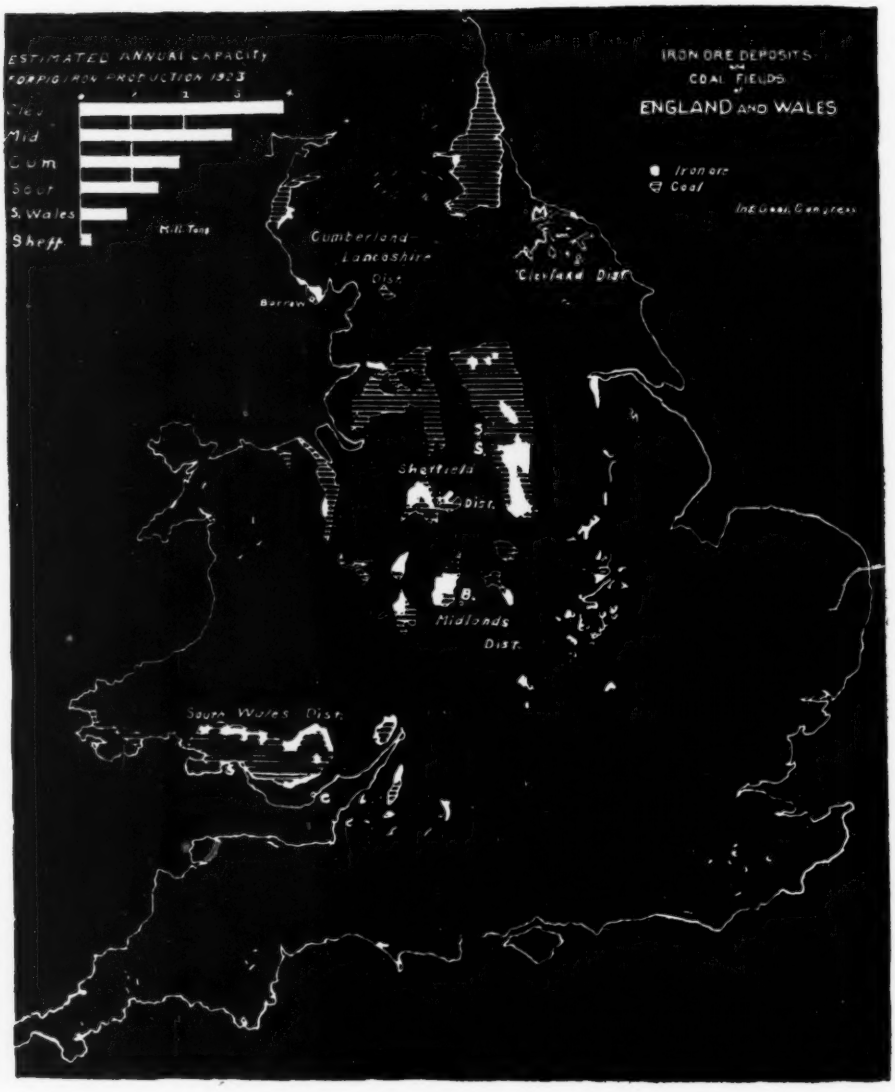

FIG. 2. Iron ore and coal fields of England and Wales

The Cleveland district in northeastern England dominates the British iron industry. Close to the Durham coal field, one of the best coking coals, on the large Cleveland iron ore deposit and on tidewater centering at Middlesborough, it has come to account for over one-third of the British output of pig iron. A gradually declining iron content and increasing difficulty of mining have increased the dependence upon foreign ores. However, many of its plants are along side deep water and transport costs are small, while the plants are the best equipped in the country. Much of the ore used is from Algeria, Spain and Sweden.

On the opposite coast in northwestern England is the Cumberland Lancashire area. Barrow-in-Furnace is the focus tho the district includes Cheshire and North Wales. Here again are local ores, coal and a tidewater position with the ship building and engineering industry at Barrow for a local market. The Cumberland ores are exceptional in being high grade (50 per cent) hematite, low in phosphorus and well suited for mixing with the leaner ores found elsewhere or for use alone by the Bessemer process.

The Midlands include, besides the "black country" about Birmingham, several scattered centers in Derbyshire and Staffordshire. Birmingham is the most inland of leading iron centers, but even it is less than 100 miles by rail to deep water on either coast.

The Sheffield district, south of the Cleveland area was one of the earliest of British metallurgical centers. Yorkshire-Derbyshire coal, iron ore from Lincolnshire and the Midlands, excellent fluxes, crucible clays and fine grinding stones are important assets. Altho inland it is connected by canal and rail with both east and west coasts, and is distant but 59 miles from Hull and only 76 miles from Liverpool. It has specialized in the lighter steel products, cutlery and hardware, but manufactures considerable quantities of heavy steel goods as well. Very little pig iron is made locally.

Originally established on the basis of local ore and charcoal the South Wales region has witnessed a series of readjustments. In the eighteenth century this district became the market for Cornwall tin, and tin plate became the important product. Tho Swansea still has a large output of tin plate it is based upon imported ores of iron and tin. A modern steel industry is the latest development based upon native coal, and the extensive plants and large number of skilled metal workers there.

The Ruhr-Lorraine District

The Ruhr-Lorraine district now the economic center of gravity of the European industrial zone is a comparatively recent development. In fact, steel making on the continent in general, began later than that in Great Britain by at least a generation. In the latter country coal and iron ore are closer together, and also closer to the seaboard than is the case on the mainland. Likewise, much of the continental ore is high in phosphorus, therefore is not suited for steel making by the *acid* Bessemer method. Not until the *basic* Bessemer process was discovered in 1880 did the Lorraine iron ores come into their own and the steel age for France and Germany begin.

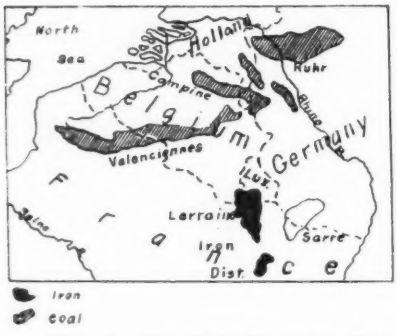

Fig. 3 The Ruhr-Lorraine Coal and Iron Region. Adapted from A. H. Brooks and M. F. La Croix

The Ruhr-Lorraine district (See Fig. 3) is an economic tho not a political unit embracing as it does northeastern France, Belgium, Luxemburg, and western Germany. A circle drawn with its center in southeastern Belgium and with a radius of 150 miles includes the largest deposits of coal and iron on the European continent. Likewise the iron and steel industry which this area supports has until recently accounted for about one-half of the world's output of those metals and at present ranks second only to the United States among world producers of iron and steel.

This industrial district is dominated by the Ruhr coal basin. Not only are there deposits of excellent coking and steam coal but the location on the lower Rhine close to the sea provides transportation facilities excelled only by some of the British industrial areas described above. Of the immense coal reserves, estimated at 216 billions of tons, at least one-half is suitable for coking. Irregularly westward projecting deposits from the Ruhr give Holland, Belgium and northern France secondary fields. Of the whole coal region, however, the Ruhr itself possesses 85 per cent, thus effectually dominating the fuel situation. The Saar basin to the South is of minor importance. While perhaps one-half of it is

coking, the quality is poor and an admixture of at least 20 per cent of Ruhr coke is required when used for the blast furnace.

One hundred and fifty miles south of the Ruhr lies the Lorraine iron ore region. Covering some 480 square miles it is comparable in size with the Pennsylvania anthracite field. Ninety-five per cent of the ore is within the French boundary, a small corner extending into Luxemburg. A small detached deposit about Nancy lies south of the main deposit. Lorraine ores are notable for (1) their great extent, containing about 48 per cent of the total metallic iron reserves of all Europe and ranking next to the Lake Superior district among the world deposits, (2) their low grade, averaging only 31 per cent iron, (3) their high phosphorus content, 1.5 to 2.0 per cent and (4) the cheapness with which they can be mined. Part of the ores contain sufficient lime to be self-fluxing. In 1913 the ores of the Lorraine region contributed over one-third of the iron produced in all Europe, 95 per cent of the French output and 50 per cent of that of Germany. During the pre-war period there had grown up two rival iron and steel industries in this region. One, the larger, was situated in the Ruhr coal region, the other, about the iron ore deposits of Lorraine. Normally "ore moves to the coal," but the low grade of the Lorraine ores, the short distance separating ore and coal and the fact that in the making of *pig iron* more ore than coke is required afforded the Lorraine section an opportunity to compete with the Ruhr, especially in making *pig iron*. Thus in 1913 the furnaces near the ore deposits produced 9.9 million tons of pig iron; those of the Ruhr, 8.2 million tons. Much of the Lorraine pig iron as well as ore went to the coal and the Ruhr in that year accounted for 9.5 million tons of finished and partly finished steel goods; Lorraine, including Luxemburg, only about one-half that much (4.9 mil. t.).

The political re-allocation of the coal and iron of the Ruhr-Lorraine region gave France the major share of the ore, and Germany the fuel which is necessary for the smelting of that ore. From the standpoint of mutual interdependence the Ruhr has the advantage for, situated close to the sea, it can if it chooses import ore via Rotterdam and the Rhine from abroad. Thus, as shown in Fig. 5, it received in 1925 some two-thirds of all the ore used, from Sweden. Lorraine, on the other hand, is dependent for about 70 per cent of its coal requirements upon the Ruhr. The coal of North France, the Saar and Lorraine is insufficient, and import-

ation from Britain is expensive. Under normal conditions the coal and iron ores of the Ruhr-Lorraine region are complementary and only oversea supplies of ores of special grade or to care for an emergency are actually needed. This was the pre-war situation. Altho political boundary lines were crossed in the mutual interchange they were of little consequence and the movement was governed by economic rather than political considerations. Con-

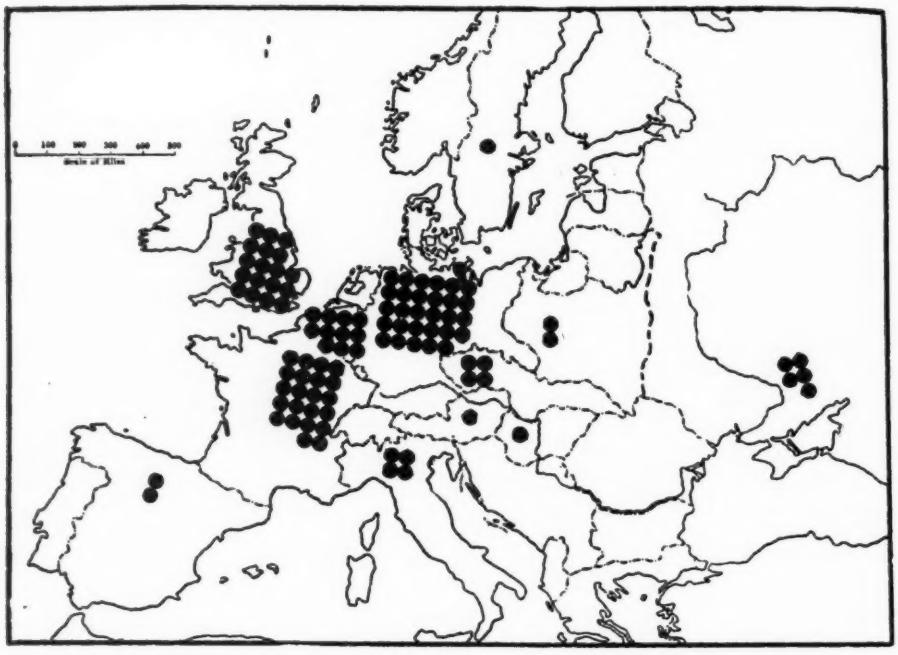

FIG. 4. European Steel production in 1925. Each dot represents 1 per cent (about 41,617 m.t.) of Europe's production. Data from League of Nations Inter. Econ. Confer. Geneva 1927. Memo. Iron and Steel

ditions since 1913 have been abnormal; politics and national animosities have interfered with economic laws and political boundaries have become economic barriers.

The combination of Lorraine ore and Ruhr coke enabled Germany to become in pre-war years the leading European steel maker (See Fig. 4). It passed England about 1902 and the five pre-war years saw it producing twice as much as Britain and four times as much as France as well as being the world's greatest steel exporter. The shifting of German Lorraine to France and the loss of Luxemburg from the German's customs union has de-

creased the German iron ore reserve by more than two-thirds. However, it still has the excellently situated Ruhr which, after all, is the principal factor in the whole scheme. In 1925, four-fifths of the total steel output of Germany was produced in the Rhenish-Westphalia district.

France, on the other hand, now possesses some 42 per cent of the metallic iron in the reserve ore of all Europe, but with only

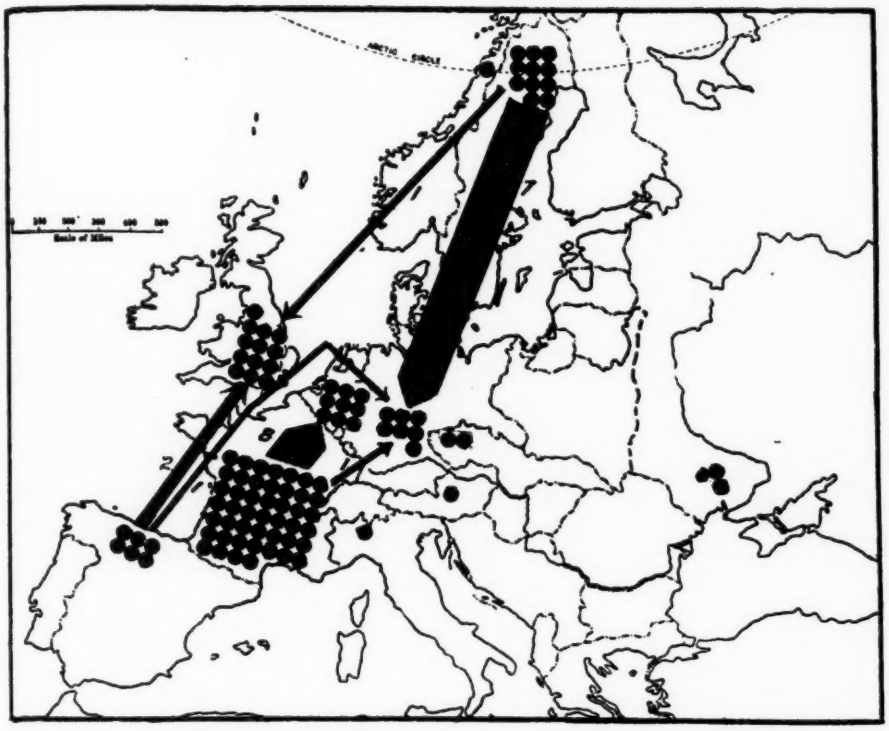

FIG. 5. European iron ore production and foreign trade in 1925. Each dot represents 1 per cent of Europe's production, and figures indicate movement in millions of metric tons.

a small addition of coal so that it is more than ever dependent upon Ruhr coal and coke. The Lorraine district now accounts for the production of 80 per cent of the pig iron and 70 per cent of the steel of all France.

Belgium's iron and steel industry is founded upon native coal and cheap efficient labor. Originally there were local iron ores but they have been largely worked out. Even its coal supply is not sufficient, about one-half of the coking coal being imported, mostly

from the Ruhr and Great Britain. In 1913, 90 per cent of its ore came from Lorraine. Luxemburg and Belgium are now in the same customs union.

SILESIA

Like the Ruhr-Lorraine district, that of Silesia is divided among three political units. Formerly the mineral deposits were chiefly within Germany, but the post-war boundary settlement gave the lion's share to Poland and a small share to Czechoslovakia.[2]

Situated at the eastern extremity of the great European industrial zone, Silesia has a very modest iron-steel industry accounting for only 6-7 per cent of the pre-war German output of those metals. Tho possessing a coal field second only to the Westphalian in extent in all Europe most of the coal is non-coking. Furthermore, the inland situation and limited supplies of local iron ores have served to prevent the development of iron and steel making on a scale at all comparable with that of Britain or the Ruhr-Lorraine districts. The industry was originally based upon local coal and ores but the best iron ores have been gradually worked out and dependence has long been placed upon supplies from Russia, Sweden, Austria and from other parts of Germany. In 1913 over one-half of the ore used was from the first three mentioned countries. Since 1921 Sweden has been the chief source, but the transportation costs are high.

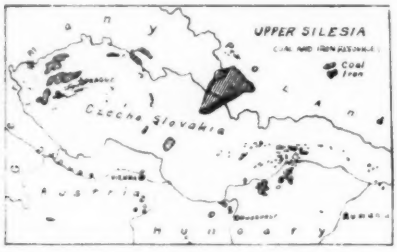

FIG. 6. Coal and iron in Upper Silesia

The separation of the industrial unit by political boundaries which have also been made customs barriers has seriously depressed the Polish metallurgical industry. As part of pre-war Germany, Upper Silesian iron and steel industries found that country a convenient source of much of its ore and a market for its manufactured iron and steel. The change due to boundary readjustments is not unlike the Ruhr-Lorraine situation. In view of this difficulty and the general handicap of location it is not sur-

[2] 100 per cent of the iron ore, 65 per cent of the pig iron, 75 per cent of the raw steel, and 78 per cent of the rolling mill production of German Upper Silesia went to Poland. Czechoslovakia possesses about 15 per cent of the whole coal basin, the Ostrava-Karvin section containing some of the best coking coal of the whole area.

prising to note a gradual trend away from the production of heavy materials and towards the manufacture of light specialties.

Outside of the great industrial zone as delimited there are three regions of interest in connection with European iron and steel production tho their actual output of metal is now small. Two of these, Sweden and Spain, are, as indicated above, sources of large supplies of ore used within the industrial plants of northwestern Europe, a third, Russia, is a large potential steel producer.

RUSSIA

The iron and steel industry of Russia is of interest more on account of its possibilities than its present production. Possessed of high grade iron ores close to coking coal and the whole near the sea-board, the natural setting is most favorable. However, the relatively low cultural and industrial development of the country together with an autocratic and reactionary government has been reflected in a small use of steel. The per capita steel consumption in 1913 (51 lbs.) was about the same as that of the United States before the Civil War. The World War and the Revolution of 1917 reduced the steel production to insignificance and the subsequent recovery has been slow.

The chief center of the industry is in the south founded upon the iron ores of Krivoi-Rog and coal of the Donetz basin. Tho the ore reserve is only about one-ninth as large as that of Swedish Lapland, the two together take first rank as the *highest grade iron ore deposits* of the continent. The Krivoi-Rog ores average 62 per cent, and are low in phosphorus. They are located only 180 miles from Donetz coking coal and 100 miles in a direct line from Nicoliev on the Black Sea.

Figs. 4 and 7 show Russian steel production in 1925 as fifth among European countries but with a per capita consumption of only 52 lbs. The industry had recovered in that year to only about one-half of its pre-war importance, but by 1926-7 the output of steel had risen to about 90 per cent of normal. Over three-fourths of the pig iron and 60 per cent of the steel in that year was accounted for by South Russia; Ural Russia and Central Russia ranking second and third respectively. It cannot be expected that Russia will be a factor in iron and steel exports for the gradual expansion of home market will probably absorb the output for many years to come.

Sweden

Sweden is a factor in the iron and steel industry of Europe whose importance is not indicated by the tonnage output as shown in Fig. 4. The industry is of peculiar interest by reason of (1) the great extent and richness of the iron ore deposits, (2) the small proportion of the ore output which is used locally (about one-sixth), (3) the absence of native coking coal and the extensive use of charcoal as a fuel, and above all (4) the high quality of the product. Swedish iron and steel, like Durham coke and Welch coal, has a world wide reputation for high quality.

Sweden's ores lie chiefly in two widely separated regions.

The northern or Lapland deposits within the Arctic circle constitute one of the world's largest reserves of very high grade ore. It is easily mined, much of it being actually quarried, the output averages about 62 per cent metallic iron, and is mostly high in phosphorus (1-2 per cent). Practically all of the product is exported, the main portion going to the furnaces of the Ruhr, a minor portion to England.

The second area is in south central Sweden, near Stockholm. Here a deposit about one-fourth as large as the Lapland ores, and mostly low in phosphorus and sulphur serves to support the local iron and steel industry. High grade ores, abundant charcoal and a population which for many generations has been skilled in fine iron and steel making has given Swedish steel its enviable reputation. Sheffield cutlery is based upon Swedish steel.

In the eighteenth century Sweden was the world's leading iron producer. Charcoal was then the standard fuel everywhere. The invention of coke as a substitute for charcoal and a series of improvements which served to produce better and cheaper iron and steel from low grade ores has served to stimulate the industry in the countries with cheap coal. As a result Sweden's output has been restricted to such foreign markets as have required special grades in which Sweden excelled. Swedish high grade charcoal steel is said to be almost as good as crucible steel and much cheaper. The increased price of wood, especially since the pulp and paper industry has grown so rapidly, has favored the use of electricity. In this process charcoal is used only as the reducing agent, the amount required being only about one-half that in ordinary charcoal smelting. However, from 1920-22 over four-fifths of the output of Swedish pig iron was made with charcoal alone; that made

by the combined use of electrical energy and charcoal accounting for about 17½ per cent.

The general trend of the industry in recent years had been towards the manufacture and export of the finished steel products rather than pig iron. Exports of pig iron from 1913 to 1925 have been reduced by three-fourths, while machinery and apparatus has multiplied about three times in the same period. The high per capita consumption of steel shown in Fig. 7 and the fact that metal manufactures now rank first in value among Swedish manufactures are evidences of this trend.

Spain

The rôle of Spain in the European iron and steel industry is, like that of Sweden, primarily as a contributor of high grade Bessemer ore for enriching the low grade product of Britain and Lorraine. Considerable quantities of ore with 50 per cent iron and very low phosphorus content are located about the rim of the Spanish peninsula within easy reach of tidewater. Tho the total export of ore is normally less than that shipped out of Sweden or Lorraine, the proportion which it forms of the total output of Spain is very large—about 90 per cent. Since the war the movement has averaged from three to four million tons, tho it was double that in the years immediately before the war. As shown in Fig. 5 the chief market is in Great Britain where they have long used the acid Bessemer process and have been accustomed to mixing local with Spanish ore. English ships are largely concerned in this trade and English capital and enterprise have long been interested in the exploitation of Spanish iron ore. As indicated above, the war and post-war disturbances as well as the approaching exhaustion of the better grades have greatly reduced this movement.

The iron and steel industry of Spain is of small consequence. Of the ore output from 1920-6 but 10 per cent was used locally. Lacking coking coal and being a non-industrialized country with limited markets for iron and steel, it was natural to depend upon foreign supplies. Wartime restrictions on such imports initiated a program of self sufficiency in the home production of iron and steel goods. Government bounties, high protective tariffs and state contracts have raised the steel output to two and one-half times pre-war figures. The industry is, however, largely artificial

and can be maintained only by continued strong government support. As shown in Fig. 4 the output is that of a third rate iron-steel country comparable with, say, Poland.

General Tendencies in the European Iron and Steel Industry

The European iron and steel industry has probably been affected more by the abnormal conditions prevailing since 1913 than has any other major activity.[3] War demands led to an enormous

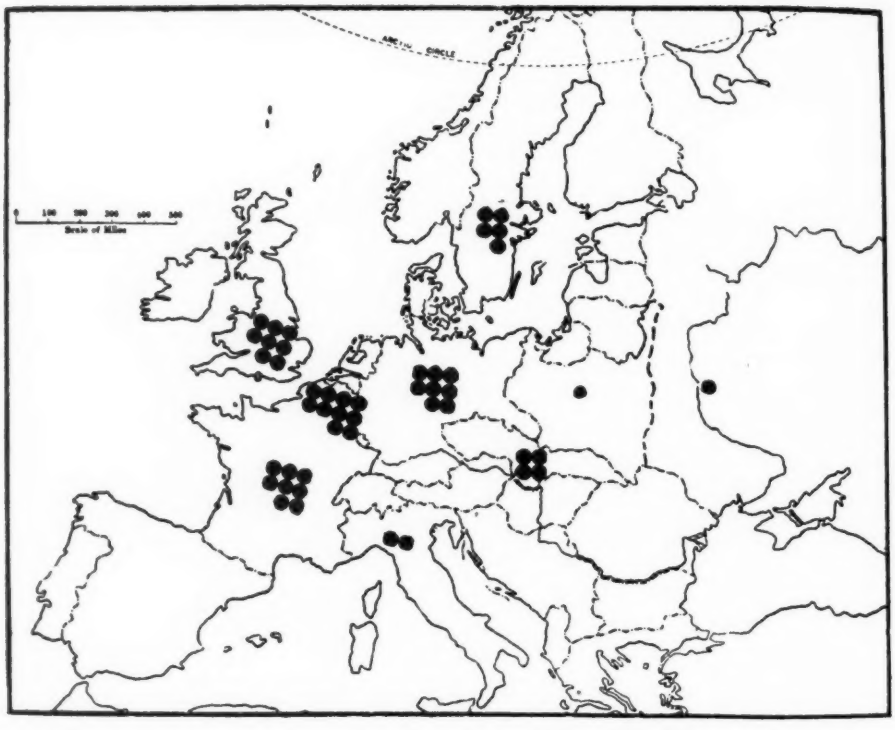

Fig. 7. Per capita consumption of steel in 1925. Each dot represents 25 kgm. (about 55 lbs.). The map is a rough index of industrialization of the various countries. Data in part from League of Nations, Inter. Econ. Confer. 1927

expansion of steel facilities in the belligerent countries. It also stimulated iron and steel making in other regions, e.g., Netherlands, Spain and Italy, whose imports of these metals were restricted. This development in new regions has been fostered by an unusual display of post-war nationalism. As a result the European steel making capacity is much larger than present needs require.

[3] In 1924 it was estimated that European industrial activity had recovered to about 60-70 per cent of its pre-war status while agricultural activities, outside of Russia, had reached 80-90 per cent of the 1913 condition.

Insofar as the leading European countries are concerned, the War served to place their production on a more even basis as shown below.

Figures are in millions of tons of raw steel.

	1913	1925
Germany	17.6	12.5
France	4.6	9.0
Great Britain	7.6	7.5

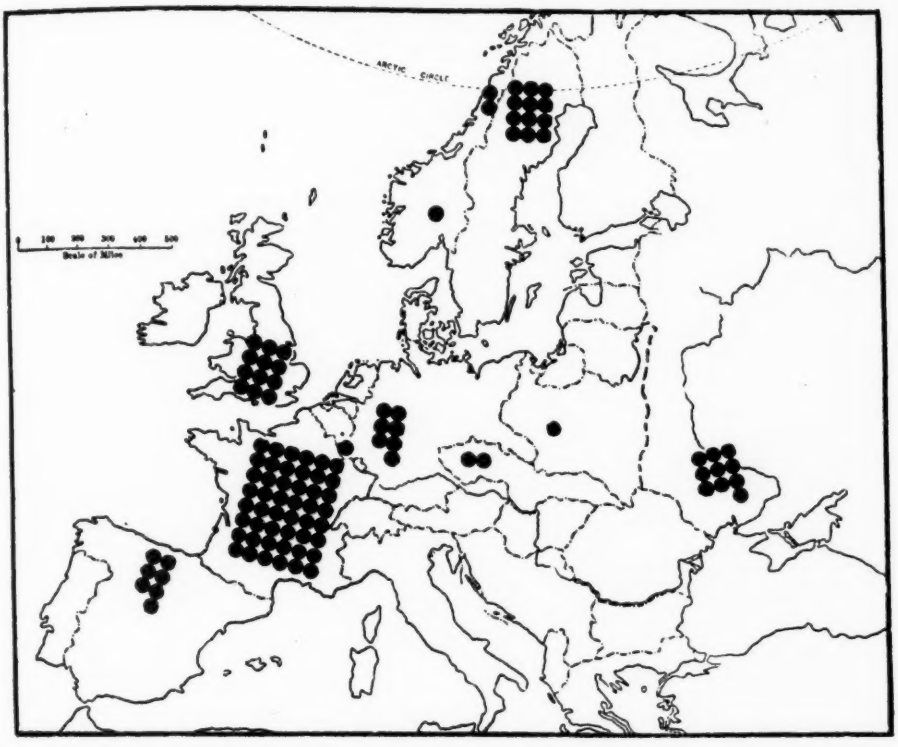

FIG. 8. Iron ore reserve according to metal content. Each dot represents 1 per cent of the total for Europe. Data from U.S.G.S.

The resumption of normalcy in the iron and steel world has been greatly retarded by changes in political boundaries. As noted above, a phenomenal growth of nationalistic sentiment together with animosities growing out of the war have turned political boundaries into economic barriers thus dislocating the scheme of movements of raw materials and manufactures as dictated by economic considerations. These obstacles to a free movement of goods within Europe is particularly serious since that continent accounts for 80 to 90 per cent of the world's exports of iron and

steel. Moreover, a good share, about 40 per cent of that movement was intra-European and the changes in political ownership have made such exchanges more necessary than ever.

As a partial solution of the difficulties of adjusting production to consumption an international steel trust has been formed (1926) including at present Germany, France, Belgium Luxemburg, the Saar, Austria and Jugoslavia. This group forms a compact core of European industry possessing one-third of the world's steel making capacity with an output over one-half of all steel produced outside of the United States and accounting for two-thirds of the world's exports of that metal. Common difficulties have thus forced co-operation among rival—not to say hostile—groups and to many it seems the most promising guarantee of peace in a war weary continent.

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RESEARCH AND EDUCATIONAL WORK IN GEOGRAPHY*

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In the industrial world, scientific research has demonstrated its efficiency and we have come to recognize that we must keep our eyes on the laboratory men if we would keep abreast of the times. Just as certainly as the physicists, chemists and engineers are serving humanity, so may those scholars who take for their field of research the problems of land utilization and the study of those environmental factors which profoundly influence the economic conditions of a people and in the end their happiness. Each nation in the world should maintain an institution endowed and equipped for geographical research and the training of research workers. In each of the larger nations several such institutions should be maintained.

As the pressure upon the land due to the ever increasing population of the earth becomes greater, it is more and more evident that environmental conditions have a greater and greater influence upon the activities of people. We do not conquer nature, we learn to adapt ourself more intelligently to the conditions provided for us. The demand for more food crops has displaced pastures from the more productive soils and likewise pressed the forests off the good soils onto the cold, humid, sandy or stony lands of the continents.

THE SELECTION OF MORE CROP LANDS

The individual who seeks to bring more land under cultivation will discover that all the better lands of the earth have been appropriated. He must turn to the next best lands that are available. It may be that he will turn to a semi-arid land and pay the cost of irrigation or he may turn to a wet land and pay the cost of drainage. He may turn to an infertile soil which has not yet attracted a farmer and pay the cost of enriching that soil so that he may produce crops. He may go farther from the lines of transportation and find it necessary to build his own road, or he may increase his distance from the market so much that his freight rates are

* Presented at the meeting of the International Geographical Union, London and Cambridge, July, 1928, by Dr. Atwood, official representative of the National Council of Geography Teachers.—EDITOR.

increased. It is clear that before making his choice, he should be conscious of all the opportunities before him and take into consideration all of the geographic and economic factors that affect his problem. He will find it important to adjust himself more carefully to the conditions which nature and man have imposed than did his predecessor who found an abundance of rich well-watered soils near to markets or near to good lines of transportation. Competition is certain to become keener and desirable parking space more limited, and therefore it is clear that man must adjust himself more and more carefully and more and more intelligently to the natural environmental conditions.

The day has come when the questions of land utilization involve the consideration of competing lands in distant parts of the world and of present and future means of transportation between the complementary geographic regions. When the surplus products of a farmer enter the world market, the prices on his products are determined by the competition which he meets from all sections of the world from which similar crops are contributed to the world market.

Geographical research should precede the utilization of the pioneer lands of the earth. The development of land policies by governments which have appropriated lands to be assigned to pioneer settlers, should be based upon geographic research in the field. The quantitative influence of degrees of relief, of varying soil conditions and of varying rainfall conditions upon land utilization, all open up great vistas of research which should be supported and promoted by an institution endowed and established for geographical research.

Development of Economic Surveys

Public utility corporations and many private industrial houses are coming to recognize the importance of economic surveys that are essentially geographic. The potential population carrying capacities of localities to be served by public utility corporations are of vital significance in laying out the plans for such service. The sources and distribution of power are significant in forecasting the industrial development of a community. The present and possible future lines of transportation are important in all problems of commerce. There is scarcely a phase of our modern economic life that does not offer to the field worker in modern human geography

an attractive research problem and an opportunity to be of real service to a community.

TYPES OF RESEARCH WORKERS NEEDED

An institution for geographical research will require the services of a group of specialists. Each one in the group must make himself an expert in some phase of geographical study or in some well defined region of the earth. There will be need for those who are trained to do exploratory work. Among them there must be well trained surveyors, who are ready to prepare topographic maps of the regions visited. Specialists in the interpretation of the physical features of the landscape, in the classification of soils and vegetation, in the study of minerals, fuels and waterpower, must be identified with a field party sent out to do geographic work. Careful climatological studies must also accompany the field studies.

In addition to those who are distinctly geographers, there should be on the staff economists interested in land economics and in the economic problems that arise in the development of foreign trade. Geographers need to check their conclusions with those of the economist working on similar problems. It is highly desirable also that such an organization retain the services of a specialist in international relations.

Geographic studies must not be limited or in any way handicapped by political boundary lines and yet the human factor and many of the economic considerations demand that the student of geography be conversant with the commercial and treaty relations between the various nations of the world.

All members of the staff must be free for a part of the time and so subsidized that they can pursue field studies in different sections of the world. They must come into the seminar or conference with first-hand authoritative knowledge of the regions of the world of which they are speaking. It is highly desirable, after each period of field investigation, that they have a program which will permit them to work up their results and prepare some of them for publication.

Such an organization has the opportunity of serving the educational institutions of the country in which it is located, the great industrial and commercial houses, especially those engaged in foreign trade, the educational publishing houses, societies that are

promoting scientific exploration, the national weather bureaus, and the governmental and private organizations interested in economic surveys.

The geographical profession needs recruits, and advanced students who have had good preliminary training in the various fields of geography should be welcomed in an institution established for the promotion of geographical knowledge. A small group of advanced students give a real inspiration to those who are promoting research work and they may serve also during their period of study as able assistants. They may profit more by being intimately associated with a more mature investigator, assisting him in his work, than thru set lecture courses. The atmosphere of a seminar or a conference among colleagues is the ideal for a group of professionally minded research students.

Charles W. Eliot, late president of Harvard University, said, "The very best kind of education is obtained in doing things one's self under competent direction and with good guidance." There is more truth and significance in that statement than most educators have yet appreciated.

A graduate school of geography should have a full equipment for cartographic work. Instruments for enlarging and reducing maps, tracing, transferring, lettering and coloring, should be at hand. A photographic department is needed where all ordinary work of development and printing can be done, where lantern slides and larger transparencies can be made and where base maps can be reproduced conveniently.

The map collections should include copies of all good maps that have ever been published and the collections should be kept up-to-date. The map is the geographer's peculiar and special means for presenting his facts. Nothing can take the place of the map and much greater use can be made of cartographic methods in presenting geographical data than has yet been made.

An indispensable department in the equipment of such an institution is the library. Full sets of the geographical periodicals of the various countries must be available. The selection and cataloging of all works bearing upon geography, mineral resources, economics and exploration, must be carried out with great care. Census reports and all other statistical publications must be gathered. The geographical work-room calls for a special library which has been selected so as to provide as much as possible of the factual material for the investigator.

An indispensable feature in such a work-room is a card catalog or index which simplifies the search for material bearing upon a problem. It is a fundamental rule that the investigator should first become familiar with all that is known on the problem under consideration before he attempts to make a contribution. It is of prime importance that those who contemplate field studies become familiar with the maps and literature bearing upon that field before they leave the work-room.

ESSENTIALS IN GEOGRAPHICAL TRAINING

In the conduct of the educational work of an institution established for the promotion of geographical studies, plans should be made so that each student receives definite training in field methods, as well as in indoor methods of research. No man should count himself a geographer who cannot enter the field and place upon the map the surface formations which are there present. He should be able to recognize and classify the topography of the region visited, the soils, the types of vegetation, and the types of land utilization. It is highly desirable for all geographers and absolutely essential for those who contemplate any exploratory work to be trained in the methods of making maps in the field. Even those who wish to keep a careful record on a reconnaissance journey should have the fundamentals of surveying included in their course of training. A good school of geography will therefore include in its curricula a certain amount of training in field methods. For those who expect to enter professionally upon educational work, there should be instruction on the selection, organization, and presentation of geography to students of various stages of advancement. Such instruction requires the services of an expert in education who is well acquainted with the supply of geographical knowledge available. There should be maintained in every School of Geography a special chair entitled Geography in Education.

ISOLATION DUE TO GEOGRAPHICAL CONDITIONS

All thru the pre-historic periods of man on this earth, and for at least four thousand years of recorded history, the great ocean bodies served as barriers to travel and perhaps fortunately so. The British and the Japanese profited by their isolation on islands of the sea and developed great internal power. Later with the con-

quest of the sea came the growth of the British and the Japanese Empires. Mountain ranges and desert regions also were great barriers, preventing easy communication between people. Thus the Chinese were restricted to a narrow coastal lowland, where they developed a wonderful civilization as yet but little known to the rest of the world. The plateau areas surrounded by high mountains, such as Tibet, the home of the Lamas, and Peru, the land of the Incas, produced unique types of civilization. The high mountain regions of the Alps, the Himalayas and the Caucasus have all led to the isolation of peoples. The smallest independent countries in the world today are in the mountains of Italy and northern Spain. There we find the tiny republics of San Mareno and Andorra. The cold lands of the Eskimos and the dense jungles of the tropics where the Pygmies live have served as local habitats, and led to the development of peculiar types of life. Isolation has been the rule not the exception thruout the world.

Isolation brought about differences in languages, in social customs, and in religion. The feuds between highlanders and lowlanders have been told in story and sung by the poets. China is struggling to overcome the influences of isolation. It is endeavoring within its own country to abolish sectional isolation, to develop national consciousness and to overcome the handicaps due to long separation from the rest of the world.

The eastern and western civilizations have met in the Orient and adjustments are absolutely necessary. Japan first faced the problem about seventy-five years ago, when Commodore Perry called upon the Mikado and presented to the Japanese people a boat load of the inventions of the western world. During the last fifty years, Japan has made remarkable progress in adjusting its ways so that it may compete in a world dominated by western civilization. All those who know the Chinese well, and certainly all friends of China, have confidence that in time the people of that country will solve the internal problems as well as the international problems that have come to them because of the thousands of years during which they have lived in isolated groups from the rest of the world.

All thru the last century, the people of the Near East have been undergoing an exceedingly difficult metamorphic process in their efforts to adjust their ways to the demands of western civilization. It is a record of wars and terrible massacres.

AMERICAN ISOLATION

In the United States of America, while passing thru a period of rapid expansion westward, the people lived more or less in isolation from the rest of the world. During that time, the American people were intensely interested in the development of new resources. They were engaged in a great adventure. New lands were being exploited, new plans for extensive agriculture with the help of machinery were being tried, great mineral wealth was being exploited, railroads were being built, and modern means of communication that have come with the development of science and technology were being developed. They were naturally self-centered. There is no doubt that there developed in the United States a strong nationalistic spirit. That was a period of isolation when many American citizens lost respect for the countries from which their forefathers came. That unfortunate condition is not entirely corrected. We find ample evidence in the actions of prominent officials within the United States of narrowness and provincialism due to ignorance of the other peoples of the world and their failure to respect those peoples. Their recent national action toward the people of Japan and China is a shameful commentary upon their intelligence. It is evidence of a gross degree of ignorance of the culture and charm of the oriental people. There is ample evidence of suspicion, due to ignorance, directing the thoughts of American people when they consider the actions of peoples in other lands.

IGNORANCE THE ONE REMAINING BARRIER

There is but one great barrier remaining between the nations of the world today. That barrier is ignorance of each other. Man has conquered space and time. The great barrier of ignorance remains to be conquered. As the improved means of travel and communication have come, trade relations have developed between this country and most of the other countries of the world. It is but a commonplace today to call attention to the economic unity of the world. But there is much more than economic unity. Just as certainly as commodities of trade pass back and forth, so do ideas travel from one country to another, and we find represented in our own commonwealths, the various political, social, and religious ideas of the other countries of the world. The days of isolation have passed, and the days for co-operation are at hand. We are living in an era when the problems of international relations are

uppermost. We must prepare ourselves and the young people of the rising generation in each country to meet these problems. Isolation is impossible.

Thru the development of science and technology, the great physical barriers that lead to isolation having been removed. The people of this world are within speaking distance of each other. They are in fact elbow to elbow, and in some parts it is even difficult to find parking space. Many economic, social, and political contacts have been established, and some already realize that we are interdependent on each other. Intelligent sympathy must be based on a knowledge of the handicaps due to topography, soil, or climate, or due to location or the inheritance of ideals of life. The last remaining barrier, that of ignorance, which so often breeds suspicion, must be removed and an intelligent sympathy must be cultivated.

GEOGRAPHY AND INTERNATIONAL RELATIONS

These facts commonly known to geographers should be known to all people. It is the duty of geographers to so function thru the educational systems in the different countries of the world, in the common schools, in the secondary schools and universities, that the fundamental significance of environmental factors is clearly understood by the great masses of people.

Geography should always play a very important part in the educational work of a nation. No subject will function more forcefully or more appropriately in the economic development of a nation than geography. No subject has greater possibilities in establishing intelligent sympathy between the people of the world than geography. No subject, therefore, has the possibilities of contributing more to the establishment of good will among the people of the earth than geography. Professional institutions founded for the promotion of this field of study should, therefore, receive the encouragement and the endowments which will allow them to function in the several countries of the world so that thru their cooperative work the peoples in each country may come to know the people of the other countries, to understand each others problems, to appreciate the interdependence of people, the folly of the old custom of settling disputes by armed force, and the inestimable economic and cultural advantages of cordial co-operation among the inhabitants of this earth.

GEOGRAPHY IN THE JOLIET TOWNSHIP HIGH SCHOOL*

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INTRODUCTORY CONSIDERATIONS

In the last few years there has been an increasing interest in all phases of geography, thru all grades of instruction, from the elementary school to the university. In the elementary schools great strides have been made, and the same is true of geography at the college level, but such progress is not apparent in general in the high school field. At Joliet there are a large number of students in geography, and we are constantly being asked questions regarding our department.

THE SITUATION AT JOLIET

During a recent semester there were 786 students enrolled in classes in the Geography Department, with the courses in physiography predominating in the teaching load. Sixty-eight per cent, or 537 were in the classes in physiograhy, 29 per cent, or 223 were in the courses in economic geography, while 3 per cent were in the one course in college geology. There are eight full-time instructors in the department.

It is immediately apparent that the large enrollment in physiography is responsible for the large corps of teachers. Physiography is required of all academic students as the freshman science course, and covers two semesters. It is felt that the work in physiography gives the student a cultural and practical background for a lasting understanding of important elements in his natural environment. This seems more valuable than a very elementary course in science which will be repeated in advanced form if he continues in school, and which he probably never will have the opportunity to get in close contact with if he leaves school, while he cannot escape close contact with his natural environment.

From the practical standpoint, in the average high school modern geography and physiography would do well to support each other. The small high schools seldom have enough students in geography to warrant the hiring of well-prepared teachers, and some teacher prepared in a non-related subject is often called upon

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to teach the class in geography. With both geography and physiography taught, there is a much greater likelihood that a teacher with some special training will be secured. It would be well that this practical point be kept in mind when geographers attempt to make themselves heard above the hubbub which surrounds the making of our modern high school curricula.

It may be said for physiography that it gives a year of work of value from both a cultural and practical viewpoint. Further, the large number of students enrolled makes possible a large quantity of equipment and material which is valuable in the geography courses.

ECONOMIC GEOGRAPHY

As has been stated, well over two hundred students were enrolled in classes in economic geography. To understand the enrollment it is necessary to briefly explain the organization of the school, as the work of the school is divided among sixteen curricula. The courses leading to Agriculture, Business Administration, Secretarial Service, Clerical Service, and Mercantile Service require two semesters of geography in the sophomore year. The course leading to Teaching requires two semesters of geography in the junior year, making six curricula which require one year of economic geography, while a seventh carries a year of geography as an elective. If we disregard the five curricula leading to trades or vocations, seven of the eleven remaining carry a year of geography. In addition to the work already mentioned, in the senior year there is offered a one-semester course in the geography of Europe as an elective.

THE WORK IN ECONOMIC GEOGRAPHY

In the teaching of economic geography in any high school the course as actually taught depends upon several factors. The elementary school preparation, the aims of the curricula in which the courses are given, the year in which the courses are given, the dominant commercial and industrial development in the community, the training of the teachers: all of these factors may influence the content of the courses and the methods of teaching.

In Joliet several of these factors are of some importance. The preparation of students in-so-far as earlier training in geography is concerned varies greatly. Forty per cent of the enrollment of the freshman class comes from country and parochial schools in

the township where the work in geography is often of a low grade. The percentage of out-of-city students is not quite so great in the second year when the geography is given, but still is large enough to create a special problem resulting from pre-high school poor preparation.

The fact that so large a proportion of our students are in the commercial curricula is important, and an effort must be made to equip them with the practical geographic training which they can use in their work in Joliet and Chicago.

Certain aims are paramount in the teaching. First is the desire to enable students to recognize the relationships involved as man adjusts his activities to the various natural environmental complexes in which he finds himself. The buildings of Niagara limestone in Joliet are an example. These relationships, and the facts relevant to them, are stressed as they are met with in the study of the fundamental activities of man. With the aid of the teacher the student works out an understanding of the relative importance of the various adjustments man makes to his natural environment in such a fundamental industry as agriculture. The same type of work is done with other fundamental activities of man as they are met with in a regional method of study. As the work goes on the student gains power in the interpretation of the relationships involved as man adjusts his activities to his natural environment in this country and elsewhere. There is great variation in the work individuals will do in handling this important aspect of geography.

Another aspect of the work has as its aim the imparting of definite knowledge of places and things. This is of course in part a by-product of the work just discussed. It involves a large number of map exercises of various sorts. "Place geography" is not taught as such, but by the use of maps and exercises involving the location of production centers, industrial developments, and the distribution of products, places are constantly tied up with geographic relationships, principles, and facts. The almost absolute lack of knowledge of places which is characteristic of students when they come to us is one of the disheartening situations which must be met. The correction of this one weakness takes a great amount of time and effort on the part of the teacher.

Only an idea can be given as to the actual plan of covering the work. There is no elaborate course of study outlined. One mimeographed sheet of suggestive outline covers the work of each semes-

ter, and each teacher does the work in his own way. The work of the first semester covers the regions of the United States proper, the second the possessions of the United States, Canada, Mexico and the Caribbean, and South America.

No Satisfactory Text

The text used is unsatisfactory, and is used only because it offers a regional treatment. In reality it is largely ignored except as a source of factual and statistical material. The book is supplemented by visual material and various other texts, including a number of copies of the second book of several elementary geography series. It is clear that the text used is unsatisfactory, but is used because it fits into our scheme of teaching better than some others. We are much interested in some of the new books which will be available soon in this field.

Qualifications of Teachers

The brevity of our teaching outline at the present time is open to criticism. This condition results in some lack of uniformity in the work covered and the points stressed. The seriousness of this lack of uniformity is minimized by the actual teaching situation. There is a very low teacher turnover in the department, so that in giving the courses each teacher has developed detailed outlines and has collected material thru a number of years. Further, the minimum requirement for all new teachers of academic subjects in the school in recent years has been the Master's degree, in addition to successful experience. Some are well on the way to the completion of the work for the Doctor of Philosophy degree. Under these conditions the lack of uniformity is not the drawback it would first appear. However, a syllabus covering in some detail the work of each semester would make certain that the cardinal geographic principles and relationships would be stressed alike by all teachers. This should help to insure that no student would pass thru the courses by acquiring a smattering of place names and isolated facts, without at least some understanding of geographic adjustments, relationships, and principles.

Equipment and Teaching Materials

In the matter of materials and equipment the department is well situated. Each teacher is the sole user of his classroom. Each

classroom is equipped with a set of four wall maps of high geographic quality. Other maps, topographic sheets, relief models, globes, and a large assortment of mimeographed base maps are available as needed.

Visual instruction is used generally when it will function as an integral part of the work. There are over two thousand slides in the collection. There is a projector for each two teachers, as well as an opaque projector for the use of the department. In addition, a film-slide machine with film equipment has been acquired recently. There is a dark room with slide making equipment, so that the slide collection is constantly being enlarged. During the last four years about one thousand dollars a year has been expended for added equipment. From now on the amount will be less, as everything is in excellent shape.

The library leaves something to be desired in the way of modern books of geographic quality, but this lack is being remedied rapidly. A complete catalog of all the material of a geographic nature available in the high school, junior college, and city libraries has been completed recently by members of the department, and put in mimeographed form for the use of all.

CONCLUSION

An attempt has been made to give a true picture of the work in geography in the Joliet Township High School, a school with a total enrollment well over two thousand. We are aware of our shortcomings as well as our achievements. The size and strength of our department is in part the result of the working together of physiography and geography. It is hoped that this exposition of conditions at Joliet relating to geography will be helpful to high school teachers of geography who are meeting the same problems.

Geography should teach one to make the most of his natural environment, and give him knowledge of the relationships between man and his environmental complexes over the world. In these times of modern communication and transportation, the ends of the earth have been brought to our front doors. Perhaps there is today in this country *a greater need at the high school level* for an understanding of geographical relationships and principles than ever before. This is the challenge the high school teacher of geography must meet.

NATIONAL COUNCIL MEETING

December, 1928

The next annual meeting of the National Council of Geography Teachers will be held at Teachers College, New York City, December 26 and 27, in conjunction with the American Association for the Advancement of Science. The Association of American Geographers will hold its meetings in New York the same week. Since this year marks the twenty-fifth anniversary of that organization the officers are endeavoring to make the program a particularly attractive one. For this reason an unusually large number of geographers may be expected in New York at this time. A number of well known geographers and other educators have also been secured to address members of the National Council. Among these are Dr. C. W. Bagley, Dr. Frank McMurry, Dr. J. Russell Smith, and De Forest Stull, Columbia University; Dr. J. Paul Goode, University of Chicago; President W. W. Atwood, Clark University; Professor R. H. Whitbeck, University of Wisconsin; Dr. N. A. Bengtson, University of Nebraska. It is also planned to have as one speaker an outstanding business man who is competent to speak of the economic and political relations of the United States with other countries. All members of the Council are urged to take advantage of the extraordinary opportunities offered by the programs of the three organizations. New York is easy of access and offers many inducements to visitors from other sections of the country. *This is an unusual year and you should make your plans now.* Headquarters will be at Hotel Bretton Hall, Broadway and 85th Street, only ten minutes from Teachers College by the Subway. The Subway station is at the Hotel entrance. Make your reservations early and state how long you expect to stay. Rates are as follows:

Single room, with private bath	$3.50 per day
Single room, without bath	2.50 per day
Double room and bath, for two persons	each 2.50 per day
Parlor, bedroom and bath for four persons	each 2.00 per day

Reduced railroad rates, on the usual certificate plan, of a fare and one-half will be available for the meeting. Watch the *Journal* for future announcements.

GEOGRAPHICAL NOTES AND NEWS ITEMS

The University of California is trying to discover "New Type Examinations." To secure this end, a contest has been instituted and prizes will be awarded the successful contestants. Those desiring information regarding the contest may write Dr. Ruck or Dr. Rice at the university. Here is an opportunity for constructive work by geography teachers in the field of education.

Heide, read and beloved by children all over the world, is being offered in an attractive new edition, fittingly commemorative of the centenary of the birth of the author, Johanna Spyri. Miss Davis, the artist who illustrated the centennial edition, spent a summer in Maienfeld getting authentic illustrations. Her impressions of Maienfeld today are added to the text. Ginn and Company are the publishers.

The Pan-Pacific Standardization Conference, which met recently in San Francisco, announces that, with the exception of the United States and the British Commonwealths, all countries bordering the Pacific have adopted metric standards. These countries are looking forward to metric adoption in the United States when the Britten-Ladd Metric Standards Bill is introduced to the Seventieth Congress.

There are some interesting geography games and suggestions for teaching third grade geography in the last Bulletin of the Nebraska Chapter of the National Council of Geography Teachers, Volume II, Number 2.

The geography section of the Minnesota State Education Association met November 11 in Minneapolis. The meeting was addressed by Charles C. Colby of the University of Chicago and George J. Miller of Mankato State Teachers' College. Miss Liem presented a demonstration lesson by a class of 7B pupils from the Marshall Junior-Senior High School. Mr. Colby also addressed the Social Science Studies Section, the subject of his illustrated lecture being, "Transplanting Mediterranean Agriculture to California."

The *Monthly Weather Review* has recently issued Supplement No. 29, "The Floods of 1927 in the Mississippi Basin," by H. C. Frankenfield and others. These floods are the greatest economic disaster in the history of the United States. More than 600,000 people were made temporarily homeless, and reported property losses total more than 284 millions. These figures are probably 25 per cent low. What causes these floods? According to the Weather Bureau, they are due to heavy rains over the central and lower valleys of the Mississippi basin, not the inflow from distant rivers arising in the mountains. The magnitude of the floods depends on the amount of rain in individual storms, their duration, and the relation of their distribution in space and time to the progress made by the flood crests in the tributaries and main stream.

General rains over portions of the central drainage basin started in August, 1926. The saturated soils were unable to dispose of the September and October rains and so disastrous floods started in the Neosho Valley of Kansas and in the lower Illinois. Thus the foundation for floods in the lower Mississippi was laid. Only a rainfall above normal for winter and spring was needed to raise the water high enough to burst the levees. These rains followed. Their relation to flood crests are shown by tables and maps. A pocket map, about thirteen miles to the inch, is included to show the flooded areas and the field of relief operations. The Supplement and map may be secured from the Government Printing Office for twenty-five cents.

Canada's available water power is estimated to be between 20 and 33 million horsepower. Nearly 5 million horsepower was utilized in 1927, an average of 513 horsepower per 1,000 inhabitants. About four-fifths of this power is developed at central stations which distribute electricity for industrial and domestic purposes. The industry using the largest percentage of power is the pulp and paper industry. Eighty-two per cent of the developed power is in the coalless provinces of Quebec and Ontario. Fortunately there are large resources of coal in southern Alberta and Saskatchewan to help compensate for their low water power resources. These statements are taken from a 94-page illustrated report—Water Powers of Canada. Water Resources Paper No. 60, Dominion Power and Reclamation Service, Department of Interior, Ottawa. The illustrations are particularly effective.

The Oregon State Council of Geography Teachers met in Portland December 29, 1927. The theme of their meeting was World Geography, or getting a world viewpoint. Miss Elsie Moore Neave of Hood River was elected president of the council. The theme of their next annual meeting will be the Curriculum and Its Topics. At that meeting they hope to compare their course of study with those of other states and at the same time get the trend of all recent geography texts.

For centuries fishing has been the dominant industry of Newfoundland. Other industries in the island have been few and only of local significance. Since 1920, however, pulp and paper manufacture has been showing such growth that in 1926 the output exceeded that of Norway and in 1927 equalled that of Newfoundland's fisheries. The island is about one-fourth forested and is well served with waterways. The indications are that the future will see increased newsprint exports.

If you need suggestions to aid you in selecting moving picture films, write for this catalog, "One Hundred Uses for Pathe Pictures," Pathe Exchange, Educational Department, 35 West Forty-fifth Street, New York City.

The Connecticut State Board of Education is using the radio to stimulate in school children an interest in nature study, better books, and the geography of Connecticut. The first program was broadcast January 13 at 2:00 P.M., over the Travelers' Station, WTIC, and will be followed by others at two-week intervals up to June 1. Schools having radio sets may adapt their programs to this free hour of entertainment and instruction. It is hoped that geographers in other states may find time to initiate similar programs in their school system.

The Visual Instruction Division of the State Department of Education of New York is preparing groups of slides to illustrate each unit of work in geography in the elementary grades. These slides will circulate only to schools within the state. This plan of New York is worthy of consideration by other states.

Three years ago the Inland Empire Council of Geography Teachers appointed a committee to study the subject of minimum essentials in elementary geography. That committee has recently submitted a report of suggested content for grades one to four. The committee is headed by Ernest E. Holmes, Head of Department of Geography, Lewiston State Normal School, Lewiston, Idaho.

The revised calendar, originated by the British scientist, Dr. Cotsworth, would divide the year into thirteen months. The extra month, Sol, would come between

June and July. Each month would have twenty-eight days and would begin on Sunday and end on Saturday, the only exception being December, which would have an extra Sunday, December 29. Those advocating the change point to the misleading data that now results from statistical comparisons of months with varying number of days. The League of Nations has approved the plan.

The engineers of the Geological Survey began the study of the recent floods in New England while the rivers were at their crest stages. When the study is completed, a final report will be issued. In the meantime advance statements are being made to the press. One of these reports that the Pemigewasset River at Plymouth, New Hampshire, had in this year's flood a peak stage of twenty-eight feet, whereas its previous maximum high-water stage during a period of forty-one years was 18.17 feet. The Winooski River, with a previous record stage of thirteen feet on the crest of the dam at Winooski Gorge, Vermont, had in this flood a stage of twenty-seven feet. It is now believed that this last flood of the Connecticut River at Holyoke was higher than any previous flood, even tho the records of that locality extend back to 1683.

Airplane views of southeastern Alaska are now available from Forest Service, Washington, D.C. The views were taken last summer by the Navy Department at the request of the Geological Survey. Each "photographic" view consists of a central picture representing the ground directly under the airplanes and the two pictures of areas adjoining the central picture. The price per group of three pictures is $1.00 if unmounted, or $1.40 mounted. To facilitate ordering, the Forest Service will furnish an index map showing the location of the area covered by each photograph.

Harvard University and Pathe Exchange have entered into a contract to prepare a series of pictures dealing with scientific subjects. According to the agreement, the Pathe Exchange furnishes the films and various science departments edit and title the pictures. At present the departments of anthropology and geology are engaged in the work. One set of pictures is for universities and colleges; another, for grade and high schools. The division of geology is working on seven pictures of interest to school children. The subjects treated are shore lines and shore development; vulcanism; the work of ground water, running water and glaciers; the mechanical work of the atmosphere, and the cycle of erosion.

The films will be known as the Pathe Science Series. The first of the series will be ready for distribution January 30, 1928.

INTEREST-STIMULATING DEVICES

The following is a sample of an "interest-stimulator" which has interested one of my classes to do very good research work. This was done by an 8B pupil. It is worked out in color on drawing paper. The pupils choose form of printing used.

Norway is near Sweden.
Oslo is the capital.
Rivers are abundant.
Water is used extensively for power.
A large amount of rain.
Yes, there are beautiful fiords.

The first letter stands out, calling attention to the topic. Names of cities, countries, rivers, mountains, etc., may be treated in the same way.

MILFRED H. SHURTLEFF
North Easton, Massachusetts

HIDDEN COUNTRIES

In each of the following sentences or groups of sentences is the name of a country. The letters spelling the words are in their exact order. Underline the name of the country.

1. The lioness gave her little cub a playful cuff with her paw.
2. Never put off making hay till the clouds cover the sun.
3. A good teacher will tell the pupil how a lesson should be learned.
4. The mariner noiselessly floating down the Po landed without being discovered.
5. I saw in the car men I am sure were going to the artist's exhibition.
6. He made on a tree near the den, marks which would indicate its location.
7. The explorers went off inland in their search for rare orchids.
8. Is that a panther? I call it a lynx.
9. Your arguments are sound. I agree. Cement is a good building material.
10. The Turk eyes with longing the distant minarets of Mecca.

W. O. BLANCHARD
University of Illinois

SPELLING GAME

This game provides spelling drill and facts.

The teacher may begin by spelling the name of a city, river, vegetation zone, mountain, boundary, etc., of the continent that the class is studying. The pupil called upon pronounces the word and uses it in a sentence. Then he in turn spells a word and may call upon someone or the child next in the row may answer.

Mis-ti: Misti—is a volcano in S.W. Peru. The Harvard Astronomical Observatory is here.

Bue-nos Air-es: Buenos Aires—is the largest city in S.A. the capital of Argentina and the largest Spanish speaking city in the world.

sel-vas: selvas—are the forests of the upper Amazon.

In-cas: Incas—are the Indians of the plateau of Peru that were conquered by Pizarro.

Ma-gall-a-nas: Magallanas—is the new name for Punta Arenas, a city in Southern Chile.

M. MELVINA SVEC
Cedar Rapids, Iowa

Have You Games or Other Devices?

It is probable that hundreds of teachers have worked out hundreds of geography games, puzzles, devices for use of pictures, maps, diagrams, lantern slides, etc., that would be of great assistance to others. Will you co-operate by writing out a clear description of one or a dozen that you have developed and send to the *Editor* of the *Journal?* Send us any teacher-aid and interest-stimulator that you have devised. Make your description as brief as is consistent with clearness. We will undertake to pass a large number of these devices on as an aid to others. Success depends upon your assistance. Write us at once.

POPULAR BOOKS OF GEOGRAPHIC VALUE

Do you equip your library with general descriptive books of travel and of a popular—scientific character, and encourage your students to read them? In past years there has been a tendency to look with disdain upon such books as unreliable, but more recently many splendid books of this type have appeared—some written by the most able authorities. Teachers will find it eminently worth while to encourage students to read widely about many peoples and many places in the world that they may be better able to appreciate other peoples and the problems that confront them. The *Journal* has followed the policy of calling attention to many books of this character. Several recent books are grouped here for convenience.

(1) Harold W. and Alice Robbins Foght. **Unfathomed Japan.** 438 pp., 72 photos. 2 maps. Macmillan Co., N.Y. 1928. (2) Knud Rasmussen, **Across Arctic America.** 388 pp., 60 photos, 6 maps. G. P. Putman & Sons, N.Y. 1927. (3) Diamond Jenness. **The People of the Twilight.** 247 pp., 28 photos and sketches, 3 maps. Macmillan Co., N.Y. 1928. (4) Paul E. Vernon. **Morocco From a Motor.** 184 pp., 48 colored illustrations, 1 map. Macmillan Co., N.Y. 1927. (5) Will H. Robinson. **Under Turquoise Skies.** 538 pp., 90 photos. Macmillan Co., N.Y. 1928. (6) J. Monroe Thorington. **The Glittering Mountains of Canada.** 310 pp., 6 maps, 111 photos. John W. Lea, 1520 N. Robinson St., Philadelphia. (7) J. H. Patterson. **The Man-Eaters of Tsavo and Other African Adventures.** 400 pp., 1 map and many photos. The Macmillan Co., N.Y. 1927.

(1) Dr. and Mrs. Foght have given us a very intimate picture of Japan and the Japanese people. Dr. Foght traveled thruout Japan from Hokkaido to Taiwan as the guest of the National Association for the Encouragement of Learning and one of the great daily papers. His purpose was to make a survey of Japanese education and to study Japan at its worst and at its best. He describes with great intimacy the fine, the modest, and the worst home, educational, and social life, ranging from head hunters of Taiwan to Ainus of the far north. The eagerness of the people for education and their efforts to obtain it, the problems of agriculture and other industries, religion, architecture, temples, shopping, and scenic beauty are all treated in an interesting and highly instructive style.

(2) Anything that Knud Rasmussen writes is worth reading many times. Few men know the Eskimo as thoroly as does Rasmussen—that tireless, intrepid explorer and seeker of the truth. By his tenacity of purpose—to know the truth—he has made a place for himself among those great men who have made lasting contributions to knowledge. He has—perhaps unknowingly—demonstrated that a popular book of travel can tell the truth and still be interesting. One who reads "Across Arctic America" will have to reconstruct some of the false ideas learned in elementary school days. The public has been too long treated to pictures and stories of the "uncivilized" Eskimo even tho the pictures showed the Eskimo to be the owner of phonographs, sewing machines, and modern rifles. The book describes the Fifth Thule Expedition from Greenland to Alaska. The overland journey was made by Rasmussen with two Eskimo companions, who made their way from one tribe to another, living on the country, sharing the life of the people, and studying all tribes along the route. He makes the Eskimo the hero of the book. "His history, his present culture, his daily hardships, and spiritual life constitute the theme and narrative."

(3) "The People of the Twilight" is another new book on the Arctic written by one who lived as an adopted son of an Eskimo and his wife and thereby was able

to enter family life and migrate with these people as the seasons changed. It is a combination of the scientific and the popular written in an easy style that awakens such an interest that one wishes to begin the next chapter immediately even tho the hour is late. In fact, the writer read the entire book at one sitting. It should make an appeal to boys from grammar grades up thru the school system to college and will supply an abundance of information.

(4) "Morocco from a Motor" is a travel tale by one who spent his vacation on a motor trip thru that interesting country. The journey extends from Algiers to Marrakesh and the author describes en route the scenery, cities, museums, market places, habits and customs of the people, as viewed by a tourist, and embellished by numerous tales quoted from other sources. It is one of the A. and C. Black series of travel books.

(5) "Under Turquoise Skies" is a fascinating tale of our Southwest. It takes one from the people of prehistoric times whose records are found in remnants of their structural works and art; the Hopis and Zunis with their religious rites, basket-weaving, and pottery-making; the Spanish and Yankee trapper and trader days; the prospector and early mining period; to the present Southwest with its agricultural development, its ranching, its industrial development, and to an appreciation of its scenic wonders. The author has lived in the region for many years and writes in sympathetic, understanding, and enthusiastic style.

(6) Are you interested in exploration and mountain climbing? The author of "The Glittering Mountains of Canada" is an able enthusiast who has gone to his work and his pleasure nearly every season for a decade. In this volume he places on record the results of numerous expeditions of his own to the Canadian Rockies and surveys the work of many others. Hence the volume is not only an interesting account of mountain exploration but an historical record as well. The illustrations are excellent.

(7) Perhaps you like tales of adventure, especially lion hunting? Colonel Patterson was an engineer engaged in the construction of the Uganda Railway in East Africa. He here sets forth some of the many problems and hardships encountered by the English in their effort to subdue the primitive wilderness and open it to civilization. The big obstacle that held up railroad construction in the vicinity of Tsavo was man-eating lions, and the volume is devoted chiefly to a description of the depredations of these beasts and the efforts to eliminate them. The remainder of the book presents other adventures of the author in Africa and descriptions of some of the African tribes.

GEOGRAPHICAL PUBLICATIONS

D. H. Smith. **An Economic Geography of Europe.** 243 pp., 27 maps and diagrams. Longmans, Green & Co., N.Y. 1925. $1.50.

In this volume of about 250 pages, the author has succeeded in bringing together an extraordinary amount of geographical material without making of it an encyclopedia of facts. After two short initial chapters on the geology and climate of Europe as a whole, there follows an analysis of the economic conditions in each of the countries of Europe. A final chapter summarizes the position of Europe among the continents with respect to resources of coal, iron, waterpower, timber, grain and sugar. As a result of his survey the author concludes that if, as many would have us believe, European civilization is on the decline, the reason is not to be found in a lack of natural endowment. This latter is ample for its 400 million inhabitants, if they will co-operate in its efficient exploitation rather than waste their energies in conflict.

The book is designed for beginners in regional geography study and should prove useful to classes which have had a semester of work in geography or physiography. Sufficient statistical data is included to assure definiteness and in most cases the prewar and postwar conditions are compared with an indication of future trends. One of the most attractive features is the generous supply of large scale maps of critical areas.

The bibliography of twenty-three titles is the only unsatisfactory page in the volume. Apparently added as an afterthought, the list of references is not well balanced, neither are the items complete in themselves. Seldom is the publisher or place of publication given and never the date of issue. Even authors' initials are usually omitted. To one searching for additional material, these omissions are most annoying. With the exception of this minor shortcoming, the book will be found extremely useful and should be a welcome addition to every geographer's book shelf.

University of Illinois W. O. BLANCHARD

H. P. Fairchild. **The Foundations of Social Life.** 295 pp. Wiley and Sons, Inc., New York. 1927. $2.75.

Dr. Fairchild, Professor of Sociology in New York University, has, in this book, contributed a discussion which will interest, and be helpful to, nearly all geography teachers. It is concerned with the topics essential to an understanding of man's activities, and supplements in a decidedly helpful way the discussions of geographers. After a brief treatment of the earth environment, he gives a good account of the human environment, which is a phase of geography ignored by many geographers. He also discusses biologic and psychologic factors which help make man what he is. The book is well written, and thoroly sound, and can be read with enjoyment and profit by any good American teacher of geography.

Indiana University S. S. VISHER

J. J. Weber. **Comparative Effectiveness of Some Visual Aids in Seventh Grade Instruction.** 131 pp., 6 illustrations. The Educational Screen, Inc., 5200 Harper Ave., Chicago, 1922.

Manufacturers and distributors of visual aids and certain educators long have been claiming considerable educational values in the use of visual aids. Very little scientific experimentation has been carried on to test these theories. This book by Dr. Weber should be of interest and value to those engaged in the field of education for it is an unbiased investigation of the value of certain visual aids which increasingly are being utilized in the public schools.

The author first of all has attempted to discover the percentage of our ideas obtained thru visual perceptions to learn whether or not sight provides a greater supply of images than either of the other senses, as so many have claimed. Then, thru four experiments, he has attempted: (1) To measure the effect of film when employed as an aid along with verbal instruction. (2) To discover the relative value of pictorial and verbal presentation in creating a concrete image. (3) To learn the comparative value of visual and verbal presentation in the development of a relatively abstract concept. (4) To test the relative efficiency of the study of a printed lesson, the same lesson presented orally by the teacher, the lesson depicted by a film, and the film presentation accompanied by explanatory comments. Extreme care was exercised in planning and conducting these investigations and the results have been interpreted in a concise and conservative manner.

The experiments were made, as the title of the book suggests, to test the "Comparative Effectiveness of Some Visual Aids in Seventh Grade Instruction." The re-

sults, however, certainly have implications for other grades as well. One of the results of the experiment, namely the indication that the value of visual presentation increases as the amount of perceptional experience found in the possession of pupils decreases, would suggest that the superiority of visual over verbal presentation would be found greater in the lower grades with the converse true for grades above the seventh. The subject matter to be studied and the particular pupils participating would have to be taken into consideration, of course, in an interpretation of this kind.

Supervisor of Visual Instruction ALFRED E. GILBERT
Schenectady, New York

E. M. Kindle. **Canada North of Fifty Six Degrees.** Sir William Price $1,000 Prize Essay, *Canadian Field Naturalist,* March, 1928, 50 pp., 30 maps, photos, Victoria Museum, Ottawa, 1928.

This is the best available discussion of the geography of northern Canada and will interest many readers of the *Journal of Geography.* Dr. Kindle has brought together, from recognized authorities, a wealth of information concerning northern Canada, giving the citations and references in full. But the first-hand knowledge which Dr. Kindle has of northern Canada is especially significant, as he is a keen observer, well-trained, and with excellent judgment. Articles by Dr. Kindle dealing with his studies in northern Canada have appeared in the *Geographical Review, Yale Review,* and in various geological and Canadian journals. He has descended the Mackenzie River to its mouth, has spent a season on the west shore of Hudson Bay, and has done much work in Labrador. He is recognized as a leading American geologist.

Dr. Kindle's paper will convince most readers that Canada north of 56° has valuable potentialities, not alone for furs, minerals and fish, but also for stock raising, and, in certain localities, for the growing of wheat and the development of hydro-electric power. His report on mineral wealth already discovered will surprise most readers and his opinion, as an able and cautious geologist, as to the great promise of future discoveries is attractive. He suggests that prospecting by hydroplane can be carried on advantageously in much of the region as lakes are numerous.

Dr. Kindle, by numerous quotations from recognized authorities and by reports of his own experiences, pretty effectively discredits the opinion widely held by people unfamiliar with the North that climatic conditions are such as to prevent civilization. He shows that the minimum temperatures along the Arctic coast of North America are higher than those in southern Canada and in northern United States, and that the ground does not freeze so deeply in various parts of northern Canada as it does in central Alaska or northern Siberia. Also that the long period without sunrise in winter is not a bar to advanced civilization since Finland and Iceland are in latitudes 60° to 65°. Dr. Kindle does, however, acknowledge that Englishmen and Americans "will have to be shown" that conditions in northern Canada permit decent living, and that the opportunities there are such that virile young men and women can afford to go there to live and rear families. The best way that northern Canada can be added to the inhabited, civilized part of the British Empire, in Dr. Kindle's opinion, is by deliberate encouragement of the settlement there of Icelanders, Finns, and Norwegians from northern Norway. The few representatives of these lands now living in northern Canada are succeeding, and if a considerable number were there and were successful in their efforts to win a good livelihood, then hardy individuals from more southern climates would come in considerable numbers.

The reviewer has visited parts of the region described by Dr. Kindle and he commends Dr. Kindle's essay to teachers of geography.

Indiana University STEPHEN S. VISHER

NEW BOOKS

George J. Miller and A. E. Parkins. **Geography of North America.** 605 pp., 295 maps, photographs and diagrams. John Wiley and Sons, Inc., New York. 1928. $4.50.

A text for normal schools, colleges, and universities. The authors hold that learning *how* to work effectively is fully as important as learning facts. The book opens with a brief discussion of various methods of organizing subject matter and then presents the subject matter organized by a great variety of methods, varying from the "problem solving" and "type unit," to an "historical treatment."

John Kirtland Wright. **The Geographic Basis of European History.** 110 pp., 5 illustrations. Henry Holt and Company, New York. 1928.

Fifth in the Berkshire Studies in European History. For college students.

W. W. Atwood and Helen Goss Thomas. **The Earth and Its People. Book One: Home Life in Far-Away Lands.** 166 pp. Illustrated. Ginn and Company, Chicago. 1928. 96 cents.

The first of a new series of elementary geographies built on the single cycle plan. Books II and III are in press and Book IV is in preparation.

F. K. Branom and Helen M. Ganey. **Social Geography Series,** Book I. **Home Land and Other Lands.** 153 pp. Illustrated. $1.00; Book II: **Western Hemisphere.** 244 pp. Illustrated. $1.32. Book III: **Eastern Hemisphere.** 216 pp. Illustrated. $1.32. William H. Sadlier, New York. 1928.

A new series of elementary geographies. Book IV, treating of world problems, is forthcoming.

Commerce Yearbook, 1926. Vol. I, United States. $1.00. **Vol. II, Foreign Countries.** $1.25. Illustrated. Supt. of Documents, Government Printing Office, Washington, D.C. 1927.

This is the first time a separate volume has been issued to cover foreign data. Volume I contains detailed information concerning business in the United States during 1926 when all previous records were broken in manufacturing output, banking transactions, and railroad traffic. The economic situation in sixty-two foreign countries is covered in Volume II. The equal area world maps used are a distinct improvement over the Mercator projection formerly used. In the future the Commerce Yearbooks will be dated with the year of issue. Thus the next issue will be dated 1928 and will probably be available in midsummer.

Lewis F. Thomas. **The Localization of Business Activities in Metropolitan St. Louis.** Washington University Studies—New Series. Socal and Philosophical Sciences No. 1. 112 pp. Illustrated. Washington University, St. Louis, Missouri. 1927.

This dissertation deals principally with the major business problems of distribution resulting from the building of a city on this particular site on the Mississippi.

John M. Hager. **Commercial Survey of the Southeast.** Domestic Commerce Series No. 19. 477 pp. Illustrated. Supt. of Documents, Government Printing Office, Washington, D.C. 1927. $1.00.

A presentation and analysis of the fundamental economic conditions within this area, with special reference to the marketing of products. The Department of Commerce hopes to complete a series of similar regional surveys covering all the important economic areas of the country. Each region will be delimited on the basis of its homogeneity in industry and living conditions. This correlation and integration of industries within a region is intended to convey a consistent picture of the economic life of the region as a "dynamic and moving entity."

McMurry and Parkins. **Elementary Geography.** Revised edition. 340 pp. Illustrated. The Macmillan Company, New York. 1928.

A re-checked and simplified text with new colored maps and photographs. A world review and a new statistical appendix have been added.

De Forest Stull and others. **A Course of Study in Geography.** 288 pp. Bureau of Publications. Teachers College, Columbia University, New York. 1927.

A tentative course of study for the primary and intermediate grades and junior high school of Horace Mann School. A manual for teachers and several illustrations of professionalized subject matter are included. Illustrative units of study are given by teachers of the Horace Mann School.

James N. Holsen. **Economic Survey of Missouri.** 241 pp. Illustrated. General Commercial Engineering Department, Southwestern Bell Telephone Company, St. Louis, Missouri. 1927.

A study of the effects that different factors have on the present and prospective telephone market in various parts of the state. To accomplish this study, the state is divided into natural regions each of which is analyzed as to its natural resources, the character and distribution of its population and principal industries.

S. S. Visher. **Facts About Fourteen Hundred Selected Place Names.** 32 pp. McKnight and McKnight, Normal, Illinois. 1927.

Place names selected from geographies in current use and arranged in convenient groups to supplement texts.

Florence C. Fox. **Playgrounds of the Nation.** Department of the Interior, Bureau of Education, Bulletin No. 20, 99 pp. Illustrated. Government Printing Office. 1927. 35 cents.

Elementary school projects based on studies of State Parks and Forests.

Howard E. Way. **Central Light and Power Plants in the Western Hemisphere.** Trade Information Bulletin No. 469. 53 pp. Government Printing Office. 1927. 10 cents.

Markets for our electrical goods analyzed largely in terms of economic, social and climatic conditions of the various countries.